FIG. 1

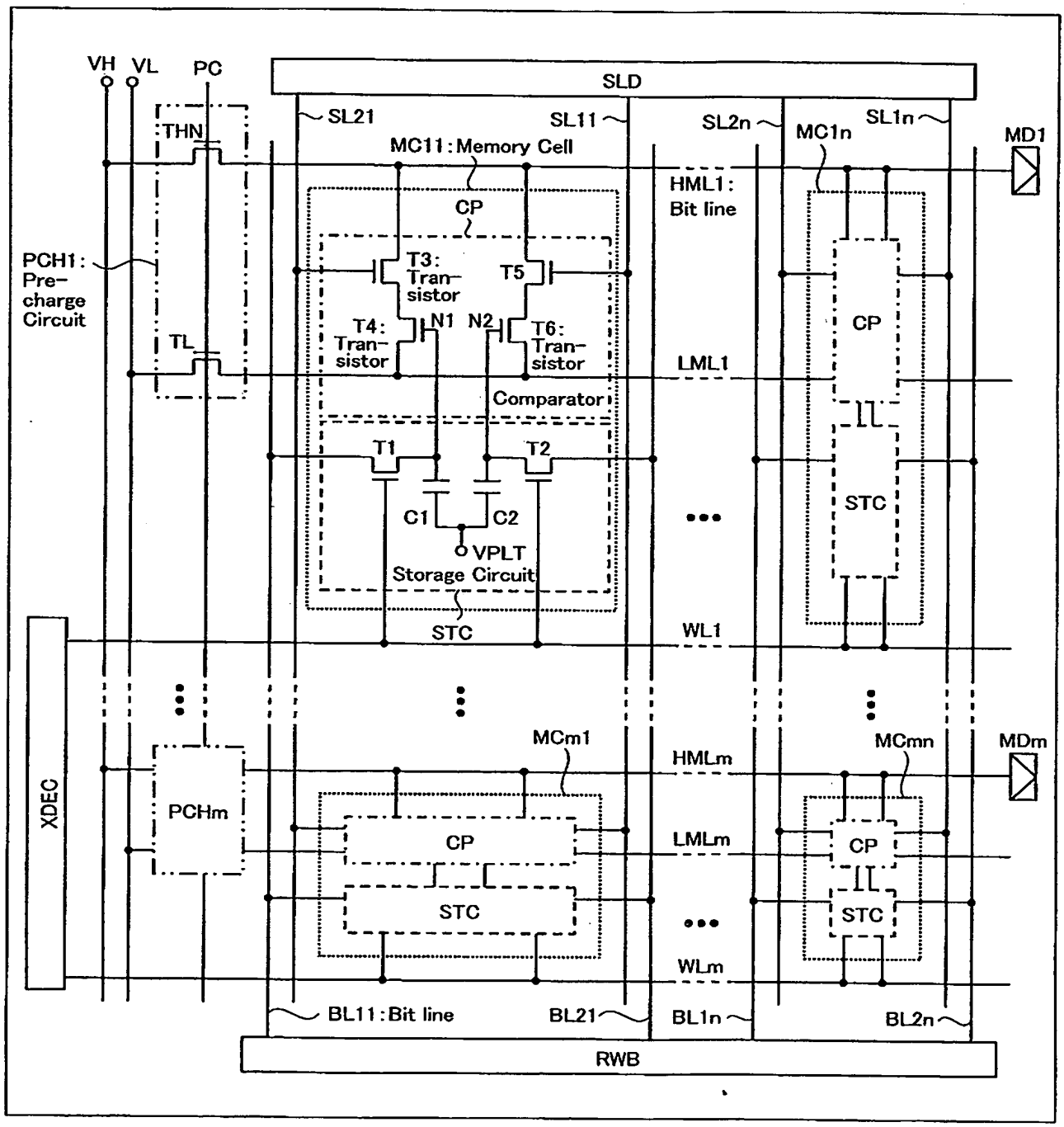
VH
VL
PC
SLD
SL21
SL11
SL2n
SL1n
MC1n
MD1
THN
MC11 : Memory Cell
HML1 :
Bit line
CP
PCH1 :
Pre-
charge
Circuit
T3 :
Tran-
sistor
T5
T4 :
Tran-
sistor
N1
N2
T6 :
Tran-
sistor
TL
LML1
Comparator
T1
T2
C1
C2
VPLT
Storage Circuit
STC
WL1
XDEC
MCm1
MCmn
MDm
HMLm
PCHm
LMLm
WLm
BL11 : Bit line
BL21
BL1n
BL2n
RWB

FIG. 2

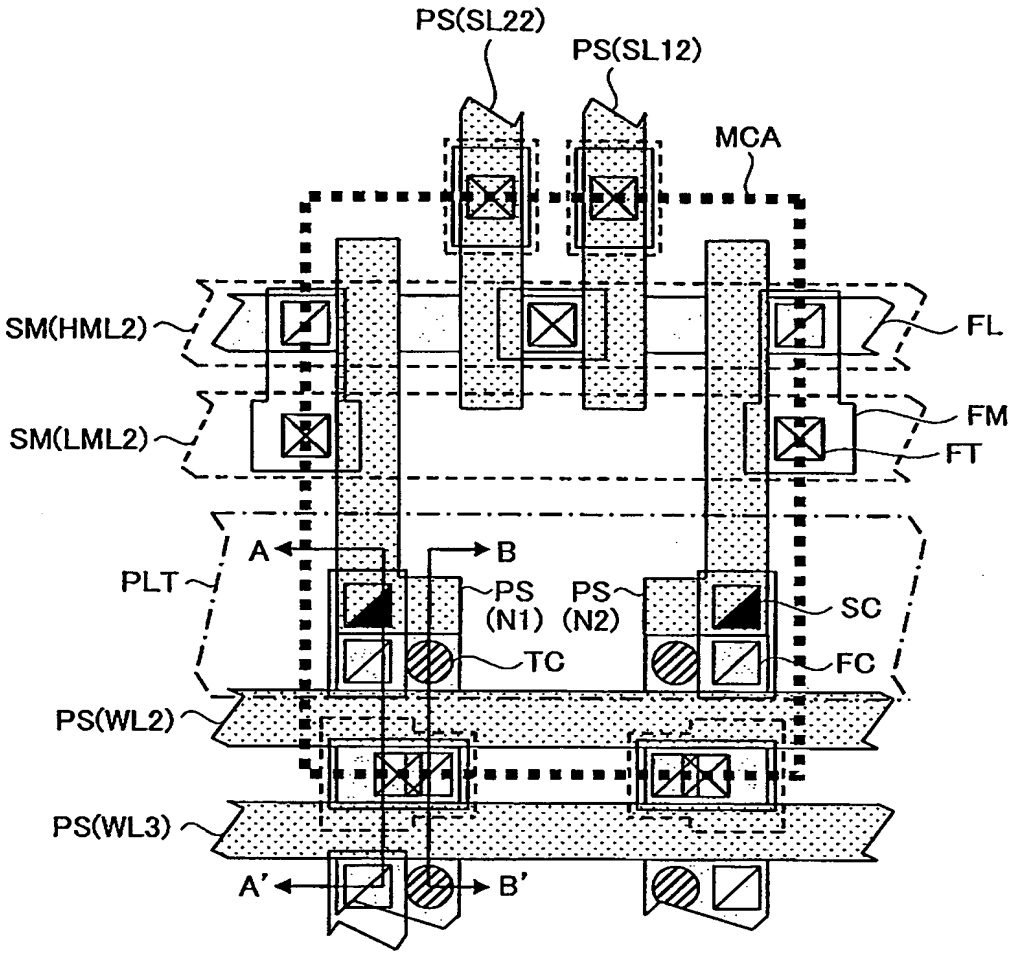
PS(SL22)
PS(SL12)
MCA
SM(HML2)
FL
SM(LML2)
FM
FT
A
B
PLT
PS
(N1)
PS
(N2)
SC
TC
FC
PS(WL2)
PS(WL3)
A'
B'

FIG. 3

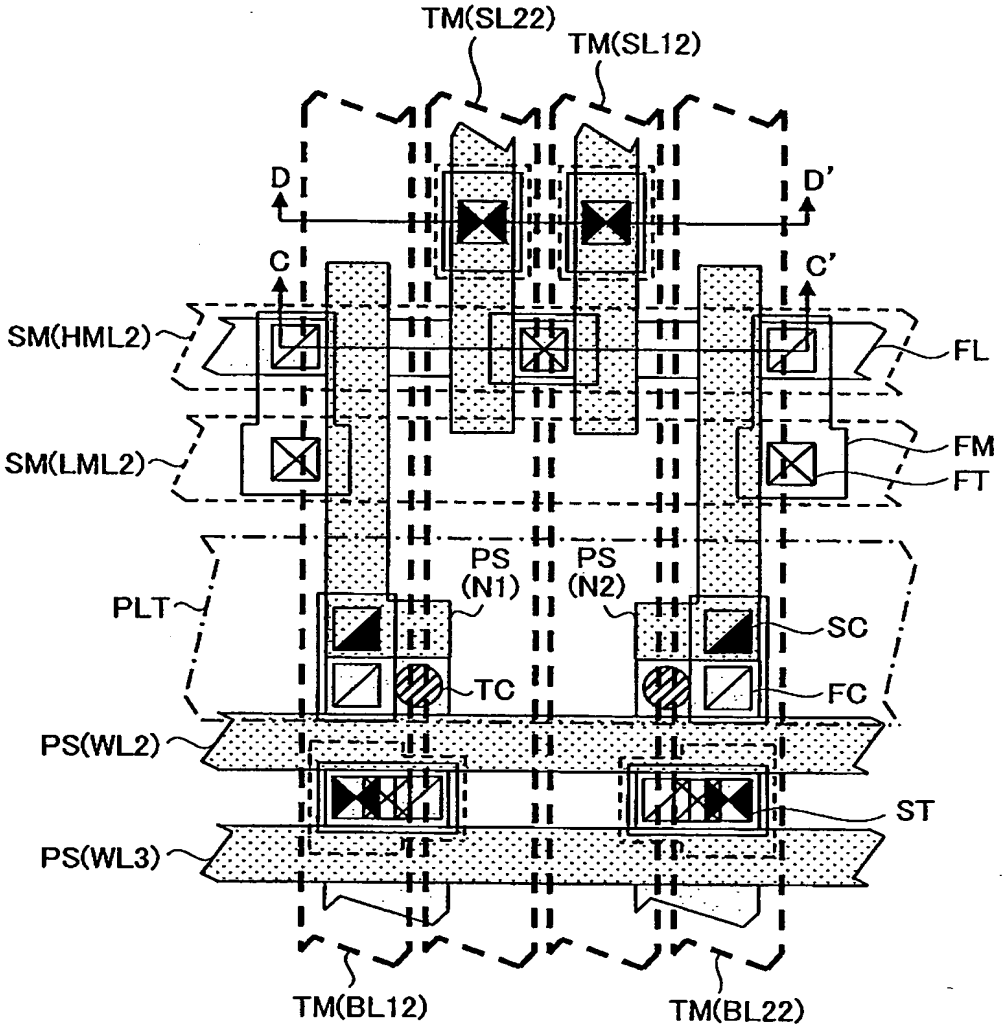
TM(SL22)
TM(SL12)
D
D'
C
C'
SM(HML2)
FL
SM(LML2)
FM
FT
PS
(N1)
PS
(N2)
PLT
SC
TC
FC
PS(WL2)
ST
PS(WL3)
TM(BL12)
TM(BL22)

FIG. 4

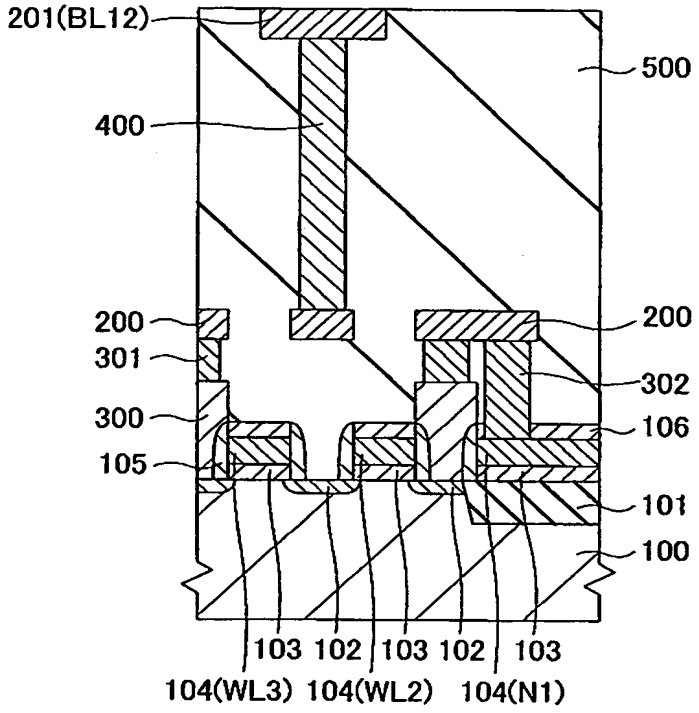
201(BL12)
500
400
200
200
301
302
300
106
105
101
100
103 102 103 102 103
104(WL3) 104(WL2) 104(N1)

FIG. 5

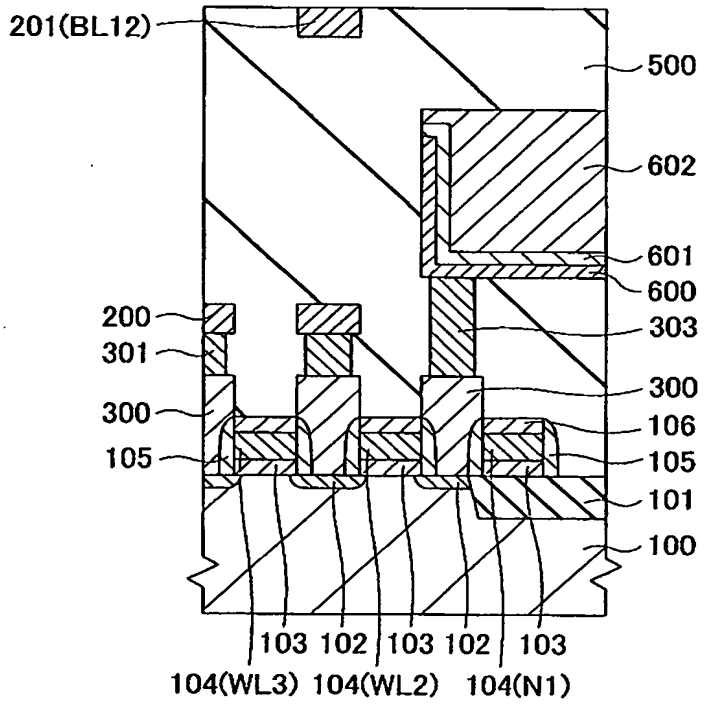
201(BL12)
500
602
601
600
200
303
301
300
300
106
105
105
101
100
103 102 103 102 103
104(WL3) 104(WL2) 104(N1)

FIG. 6

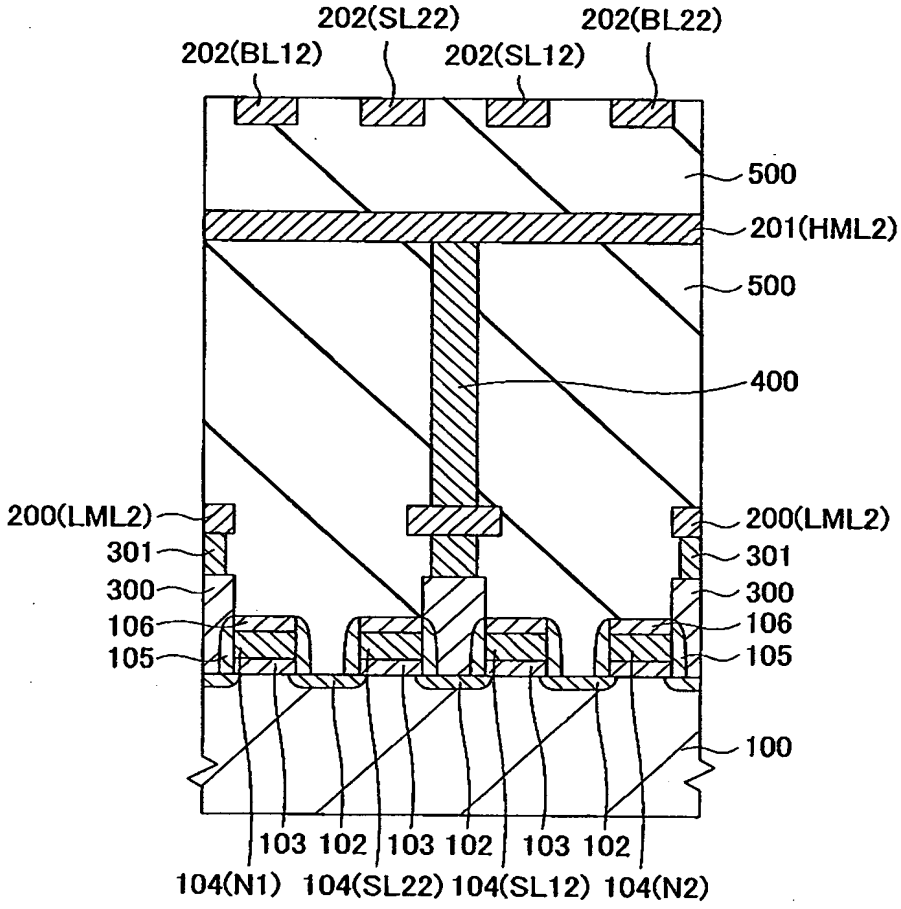
202(SL22)
202(BL22)
202(BL12)
202(SL12)
500
201(HML2)
500
400
200(LML2)
200(LML2)
301
301
300
300
106
106
105
105
100
103 102 103 102 103 102
104(N1) 104(SL22) 104(SL12) 104(N2)

FIG. 7

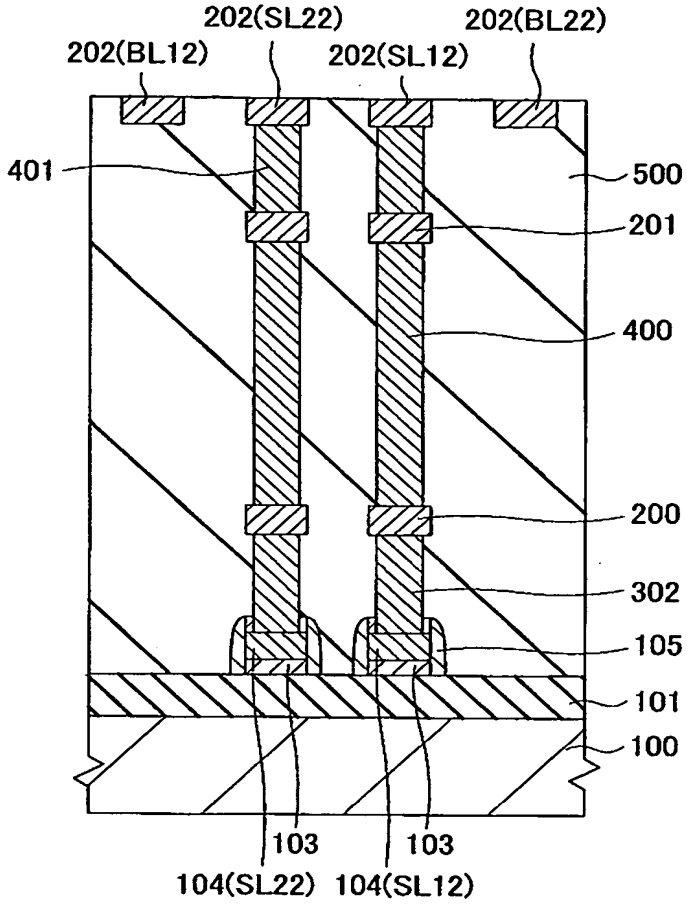
202(SL22)
202(BL22)
202(BL12)
202(SL12)
401
500
201
400
200
302
105
101
100
103
103
104(SL22)
104(SL12)

FIG. 8

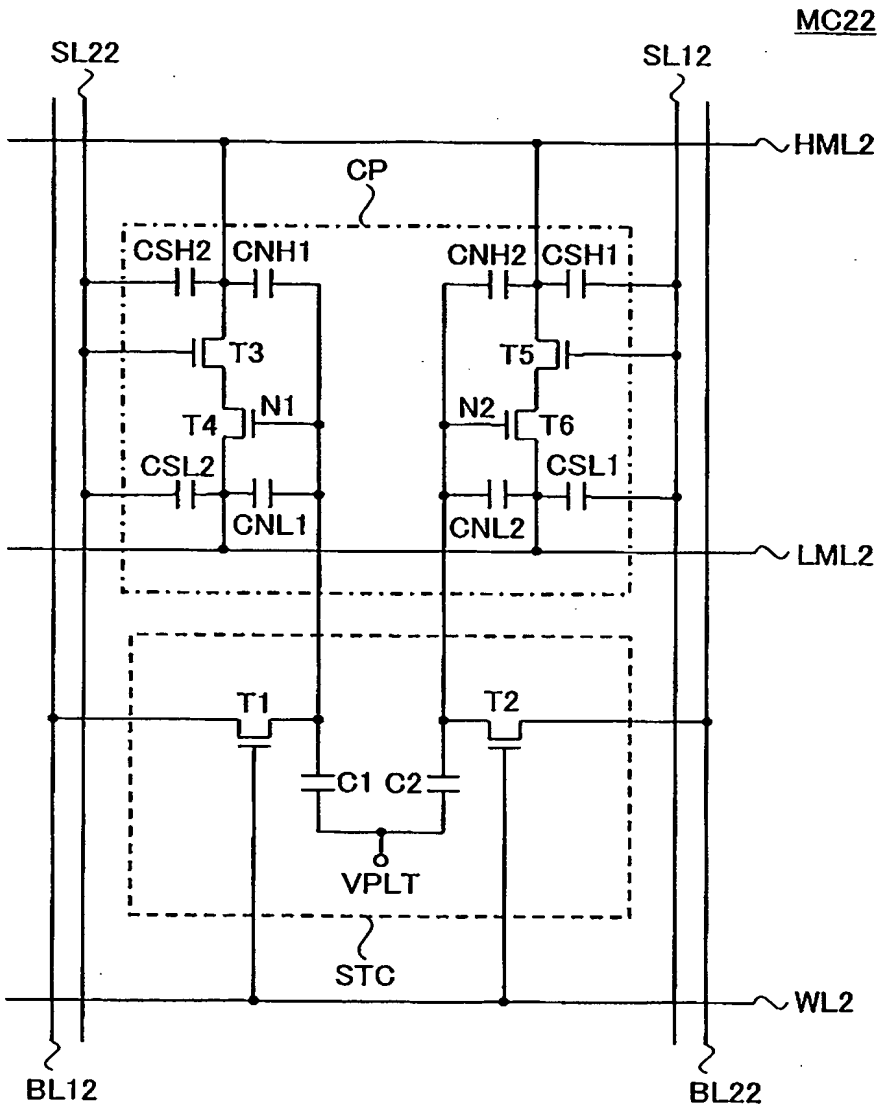
MC22
SL22
SL12
HML2
CP
CSH2
CNH1
CNH2
CSH1
T3
T5
N1
N2
T4
T6
CSL2
CSL1
CNL1
CNL2
LML2
T1
T2
C1 C2
VPLT
STC
WL2
BL12
BL22

FIG. 9

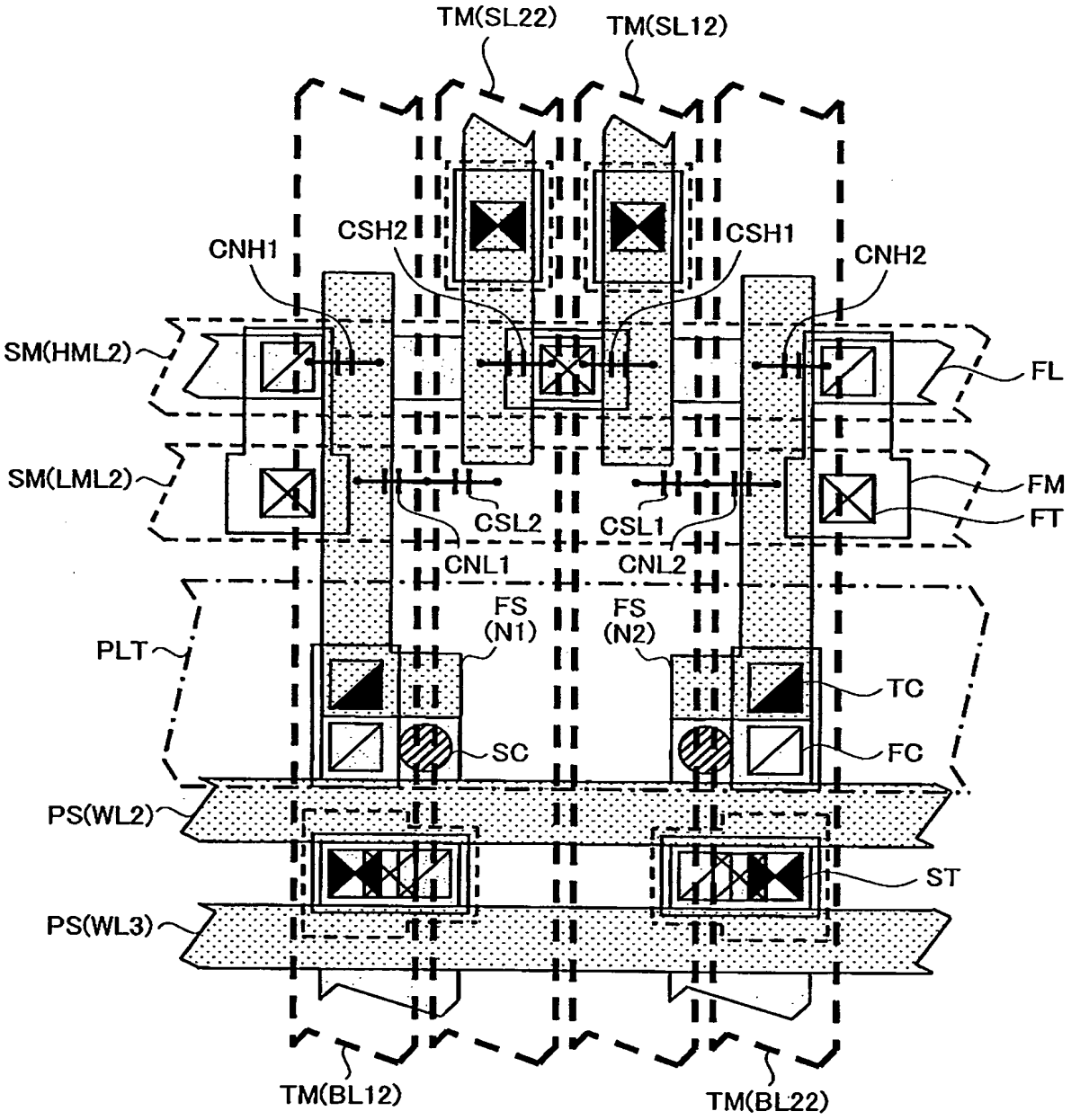
TM(SL22)
TM(SL12)
CNH1
CSH2
CSH1
CNH2
SM(HML2)
FL
SM(LML2)
FM
FT
CSL2
CSL1
CNL1
CNL2
FS (N1)
FS (N2)
PLT
TC
SC
FC
PS(WL2)
ST
PS(WL3)
TM(BL12)
TM(BL22)

FIG. 10

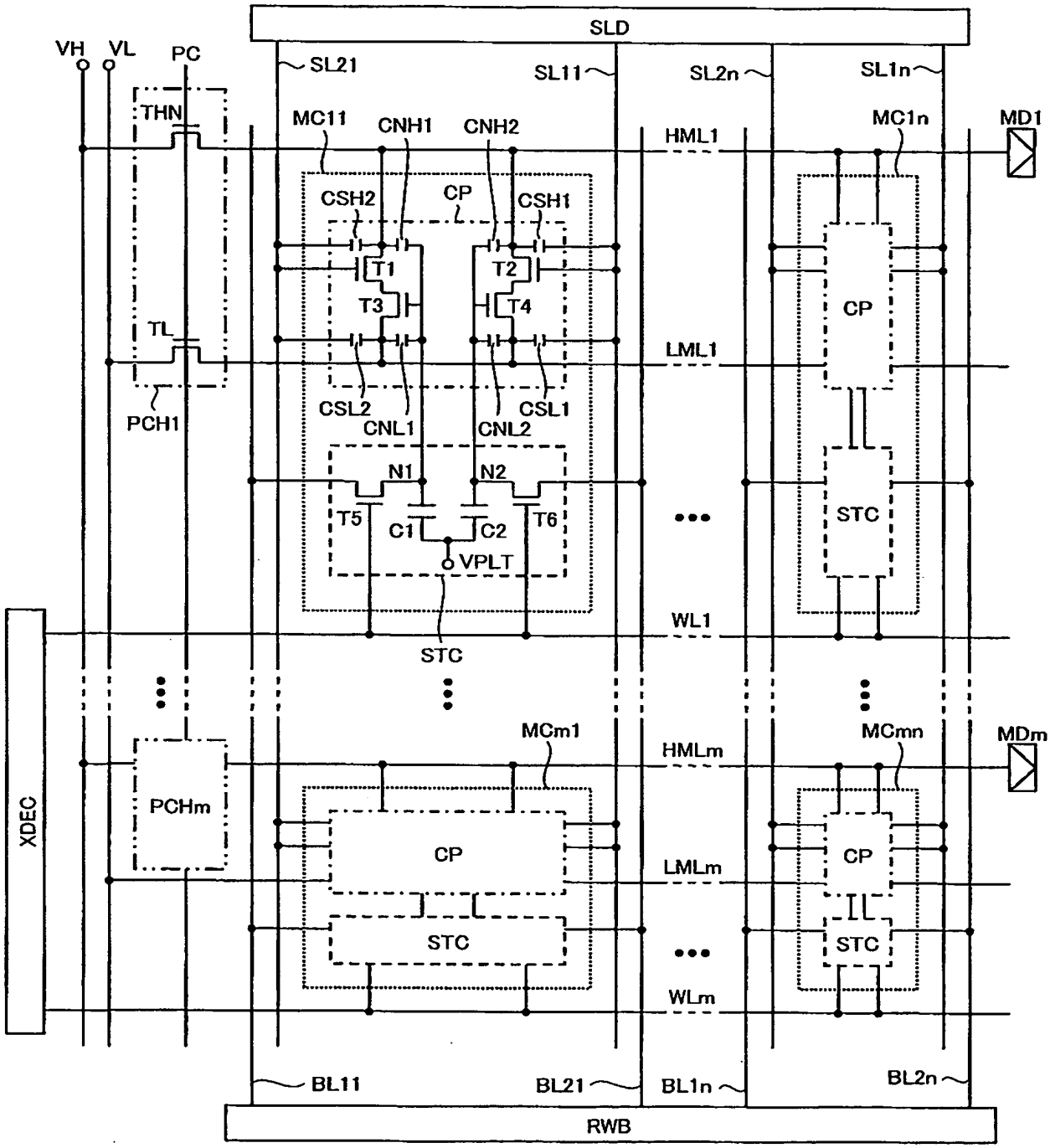
SLD
VH
VL
PC
SL21
SL11
SL2n
SL1n
THN
MC11
CNH1
CNH2
HML1
MC1n
MD1
CSH2
CP
CSH1
T1
T2
T3
T4
CP
TL
LML1
CSL2
CSL1
PCH1
CNL1
CNL2
N1
N2
T5
C1
C2
T6
STC
VPLT
WL1
STC
XDEC
MCm1
HMLm
MCmn
MDm
PCHm
CP
CP
LMLm
STC
STC
WLm
BL11
BL21
BL1n
BL2n
RWB

FIG. 11

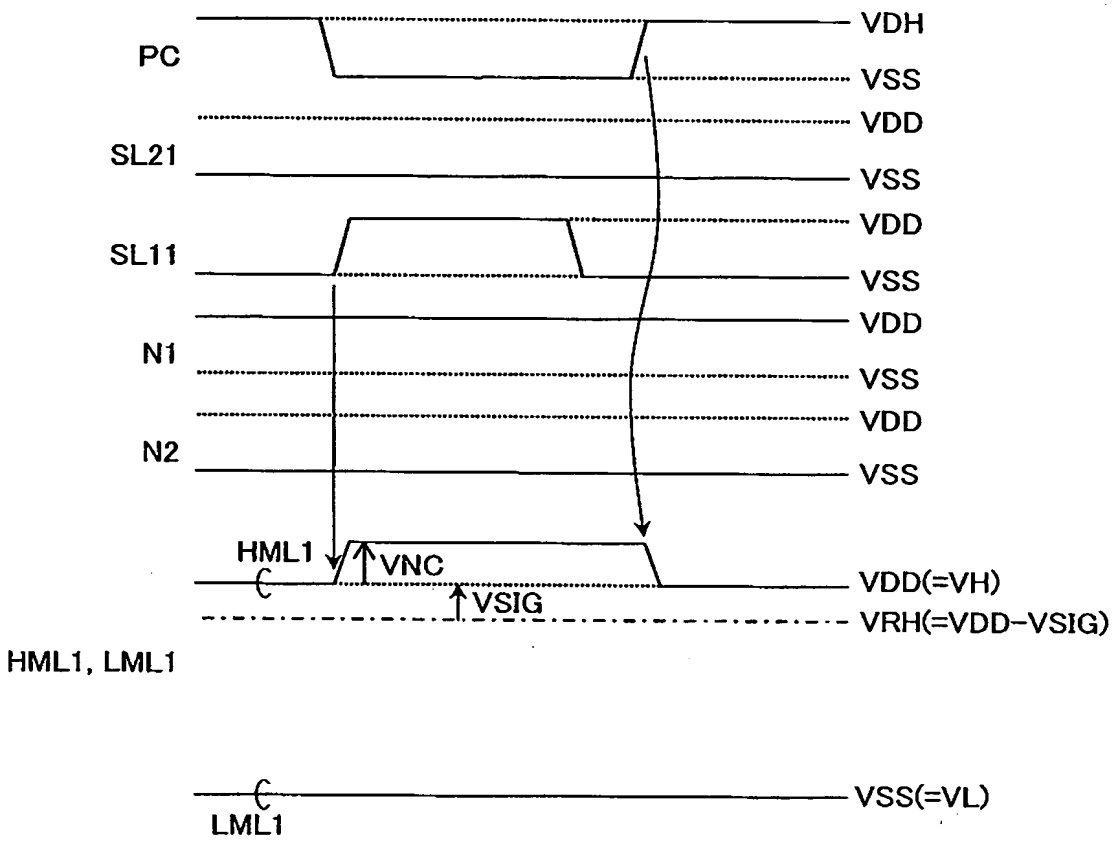
PC
SL21
SL11
N1
N2
HML1
VNC
VSIG
HML1, LML1
LML1
VDH
VSS
VDD
VSS
VDD
VSS
VDD
VSS
VDD
VSS
VDD(=VH)
VRH(=VDD-VSIG)
VSS(=VL)

FIG. 12

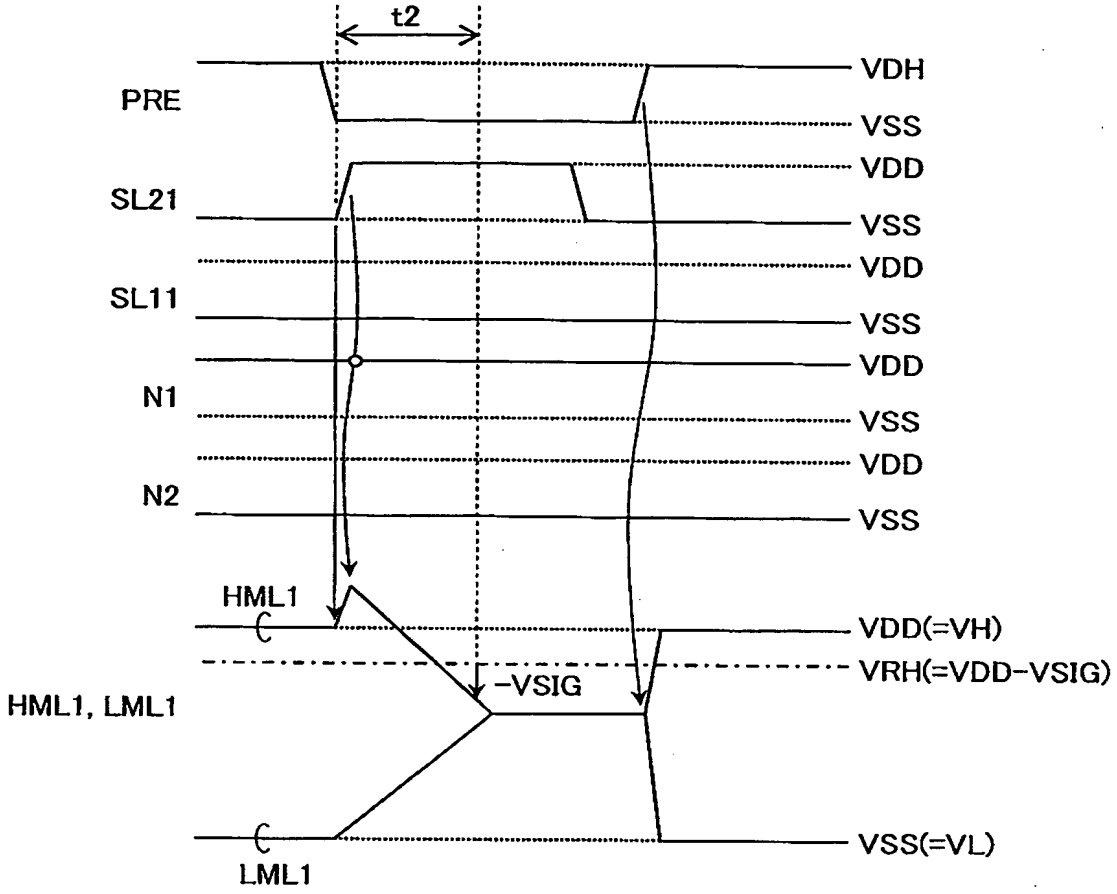
t2
PRE
SL21
SL11
N1
N2
HML1
HML1, LML1
LML1
VDH
VSS
VDD
VSS
VDD
VSS
VDD
VSS
VDD
VSS
VDD(=VH)
VRH(=VDD-VSIG)
-VSIG
VSS(=VL)

FIG. 13

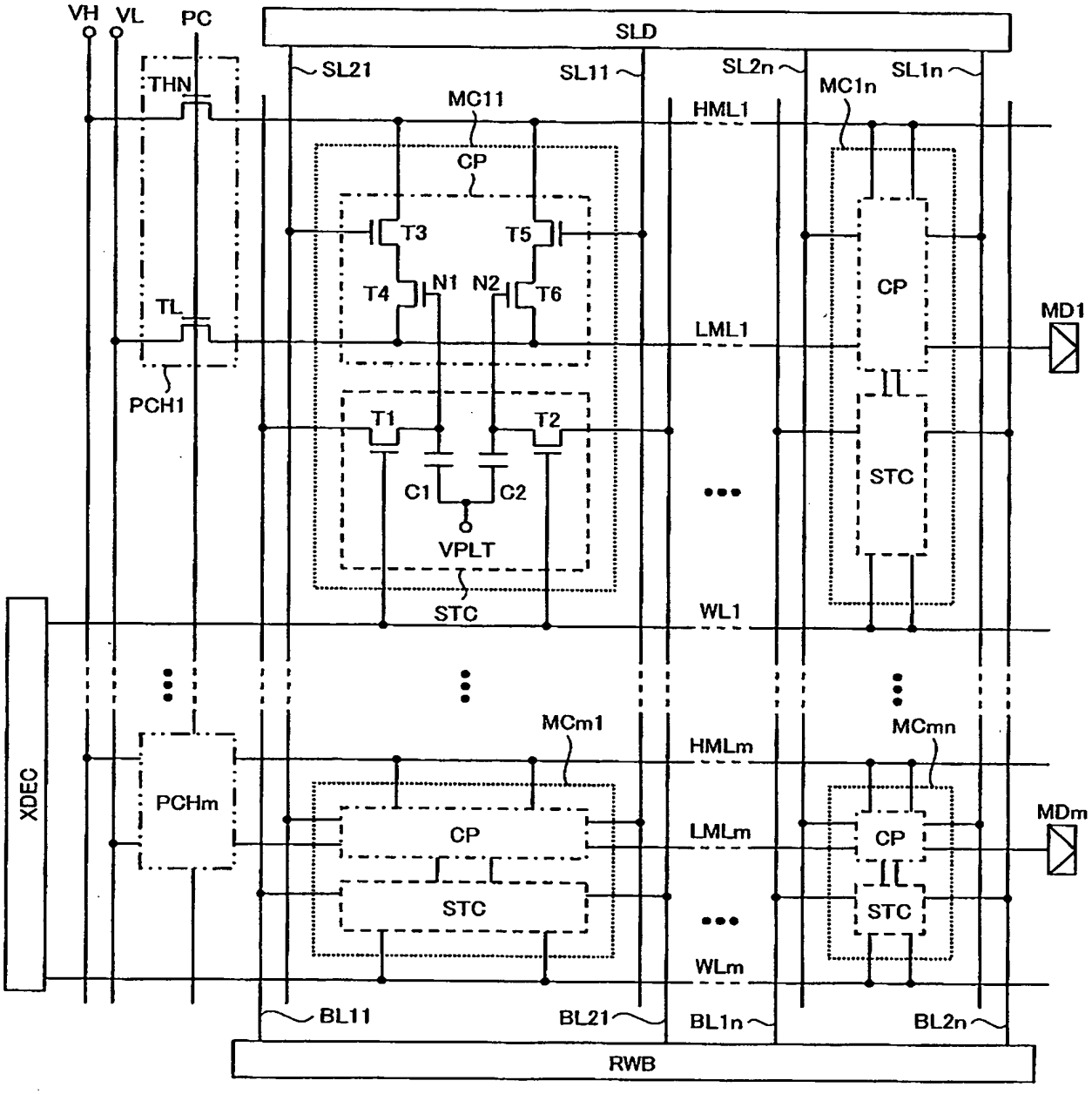
VH
VL
PC
SLD
SL21
SL11
SL2n
SL1n
THN
MC11
MC1n
HML1
CP
T3
T5
T4
N1
N2
T6
TL
LML1
MD1
PCH1
T1
T2
C1
C2
VPLT
STC
WL1
XDEC
MCm1
MCmn
HMLm
PCHm
LMLm
MDm
WLm
BL11
BL21
BL1n
BL2n
RWB

FIG. 14

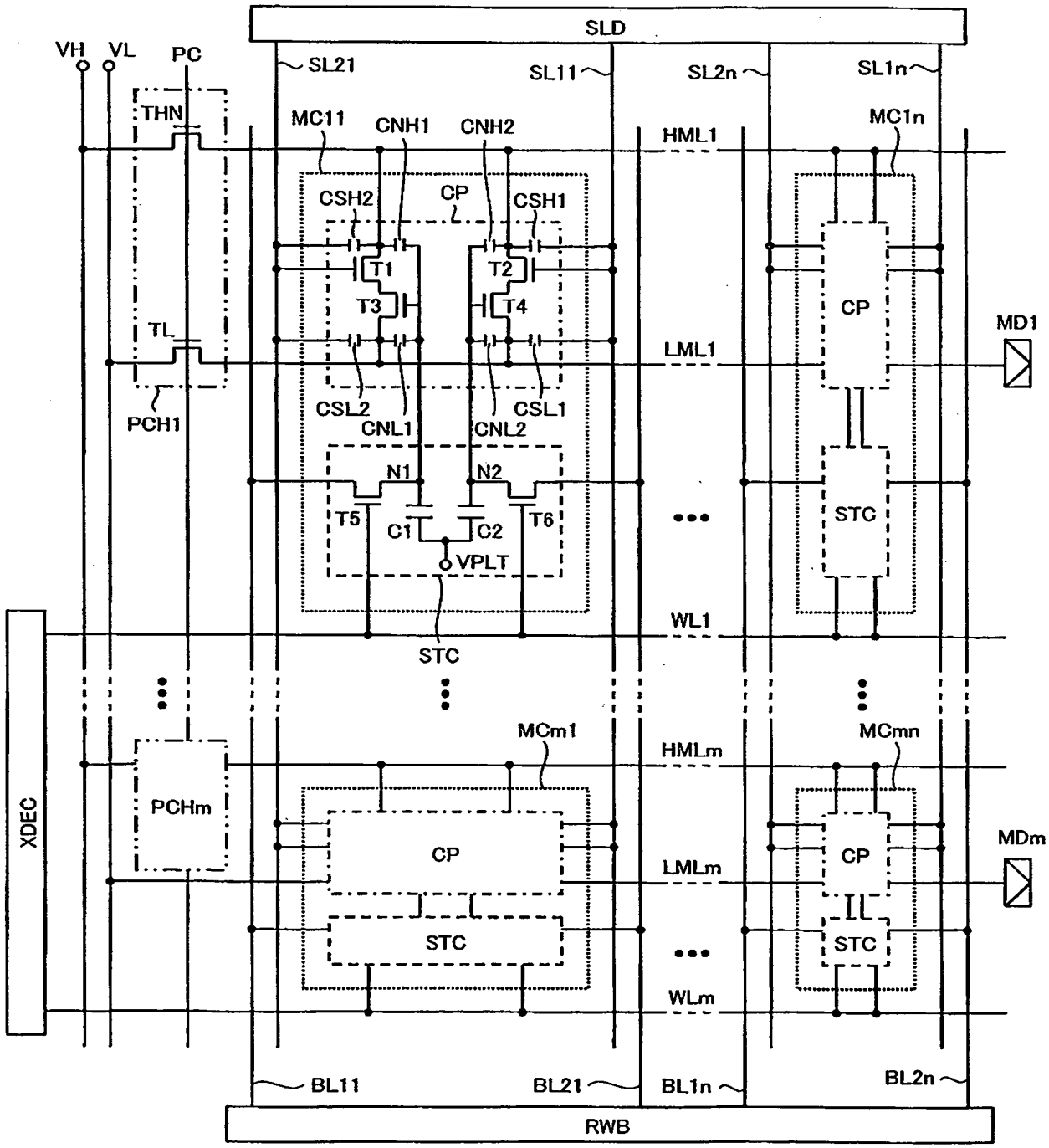
SLD
VH
VL
PC
SL21
SL11
SL2n
SL1n
THN
MC11
CNH1
CNH2
HML1
MC1n
CSH2
CP
CSH1
T1
T2
T3
T4
CP
MD1
TL
LML1
PCH1
CSL2
CNL1
CNL2
CSL1
N1
N2
T5
C1
C2
T6
STC
VPLT
WL1
STC
XDEC
MCm1
HMLm
MCmn
PCHm
CP
CP
MDm
LMLm
STC
STC
WLm
BL11
BL21
BL1n
BL2n
RWB

FIG. 15

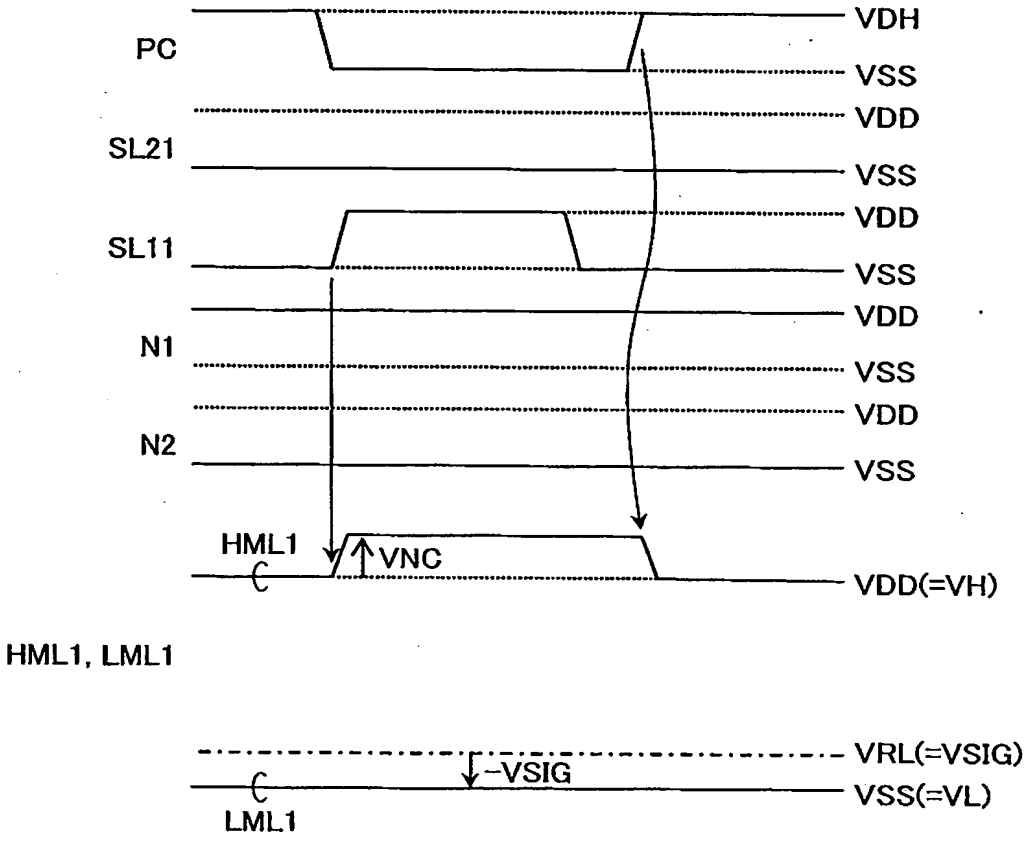
PC
SL21
SL11
N1
N2
HML1
VNC
VDH
VSS
VDD
VSS
VDD
VSS
VDD
VSS
VDD
VSS
VDD(=VH)
HML1, LML1
VRL(=VSIG)
-VSIG
VSS(=VL)
LML1

FIG. 16

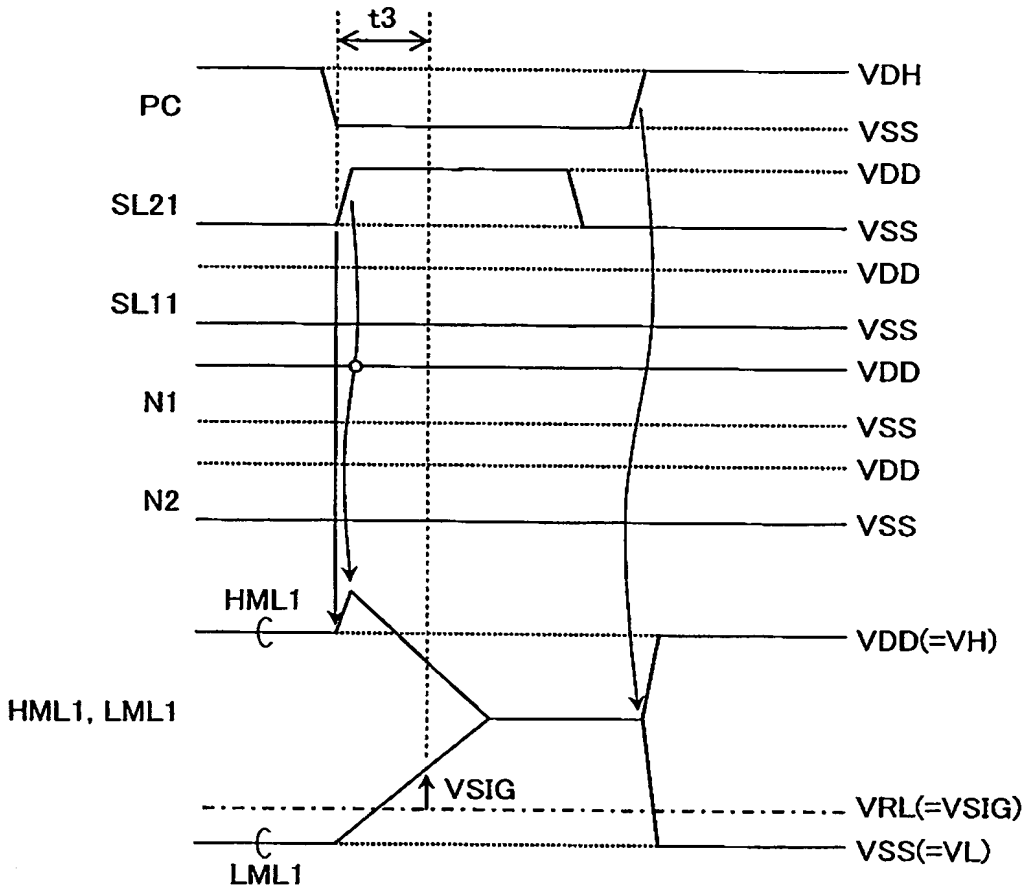
t3
PC
SL21
SL11
N1
N2
HML1
HML1, LML1
LML1
VSIG
VDH
VSS
VDD
VSS
VDD
VSS
VDD
VSS
VDD
VSS
VDD(=VH)
VRL(=VSIG)
VSS(=VL)

FIG. 17

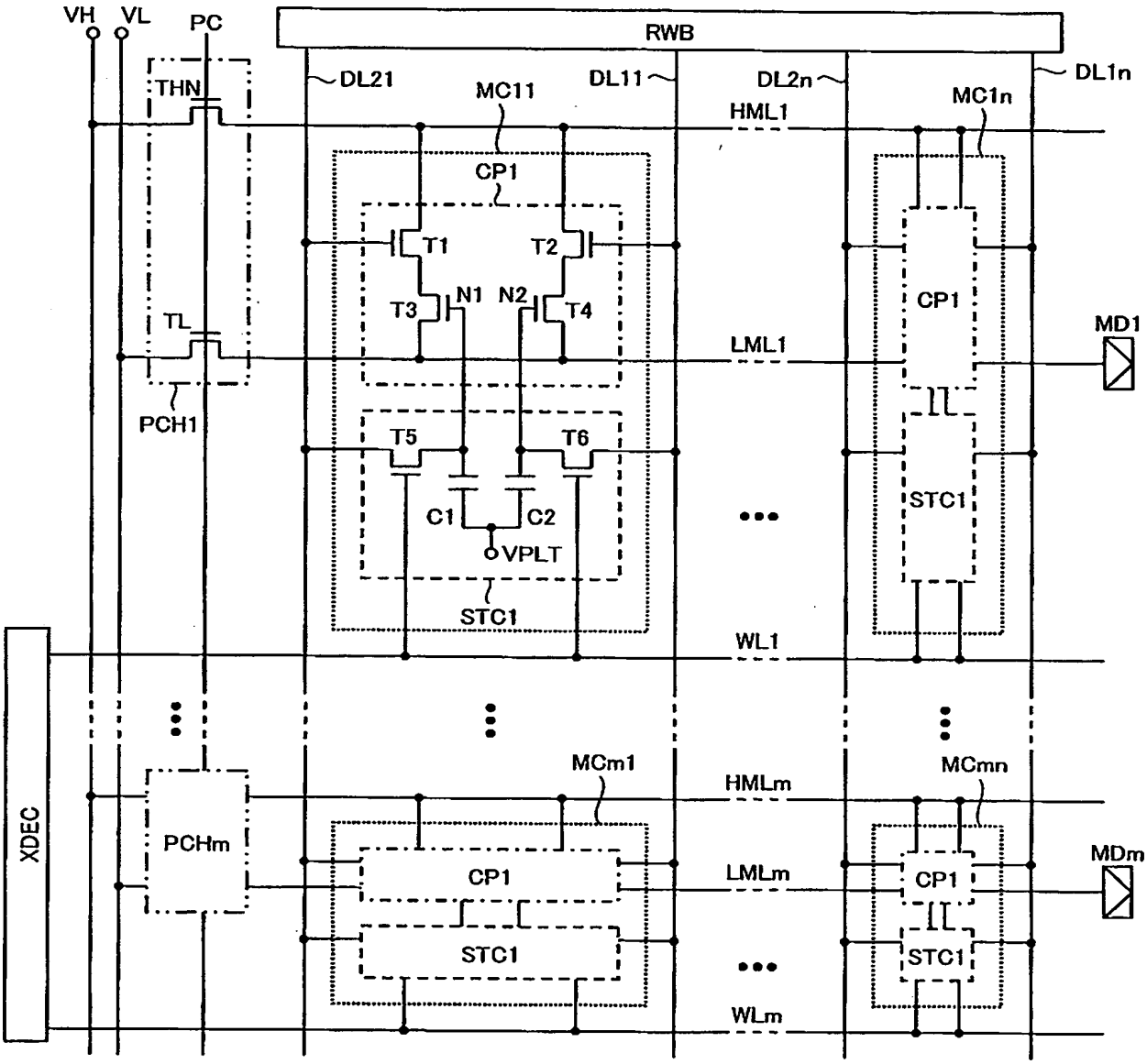
VH
VL
PC
RWB
THN
DL21
MC11
DL11
DL2n
MC1n
DL1n
HML1
CP1
T1
T2
T3
N1
N2
T4
TL
LML1
MD1
PCH1
T5
T6
C1
C2
VPLT
STC1
WL1
XDEC
MCm1
MCmn
HMLm
PCHm
LMLm
WLm

FIG. 18

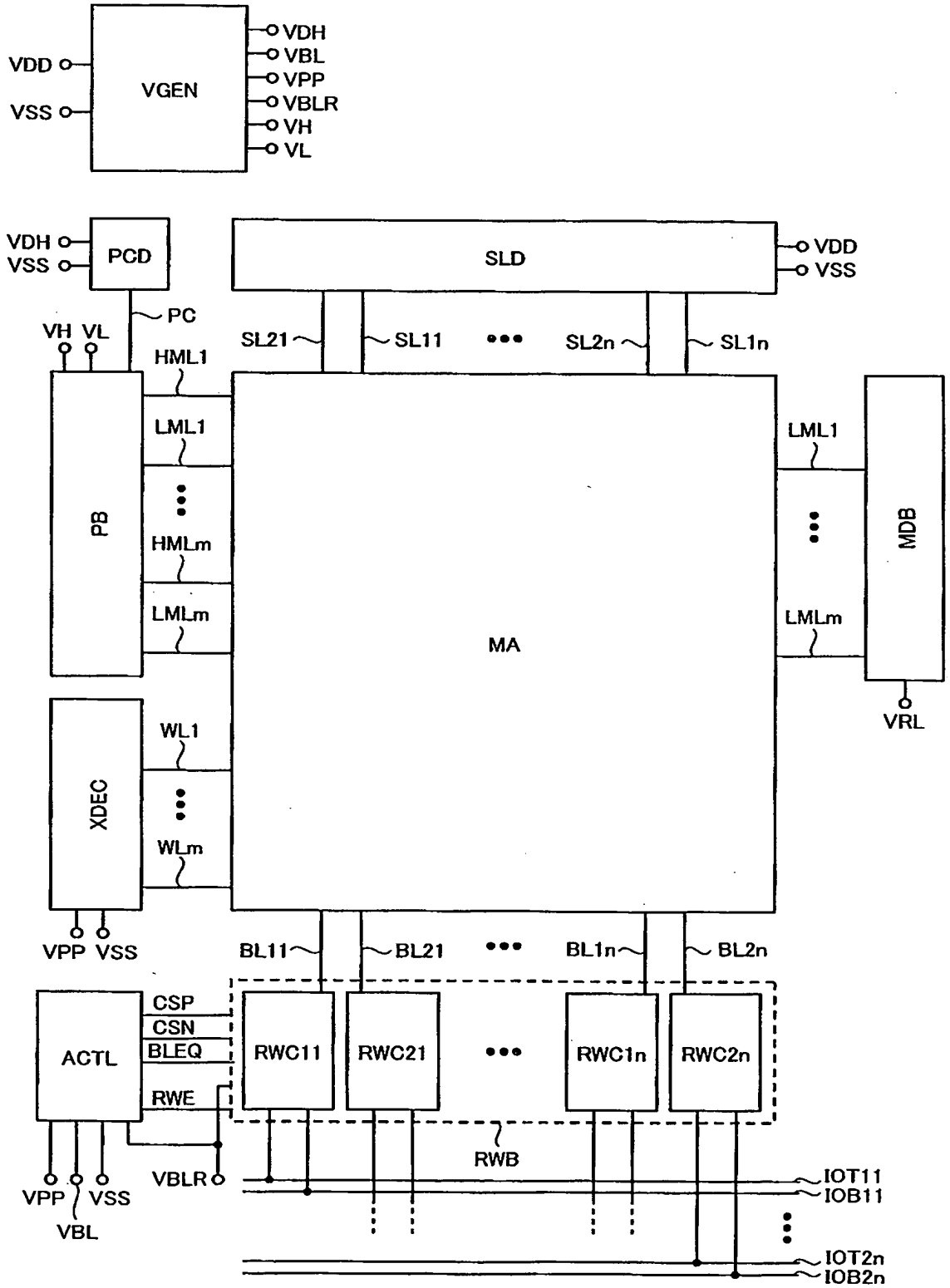
VDD
VSS
VGEN
VDH
VBL
VPP
VBLR
VH
VL
VDH
VSS
PCD
SLD
VDD
VSS
PC
VH VL
HML1
SL21
SL11
SL2n
SL1n
LML1
PB
HMLm
LMLm
MA
LML1
MDB
LMLm
VRL
WL1
XDEC
WLm
VPP VSS
BL11
BL21
BL1n
BL2n
CSP
CSN
BLEQ
RWE
ACTL
RWC11
RWC21
RWC1n
RWC2n
RWB
VPP
VSS
VBLR
VBL
IOT11
IOB11
IOT2n
IOB2n

FIG. 19

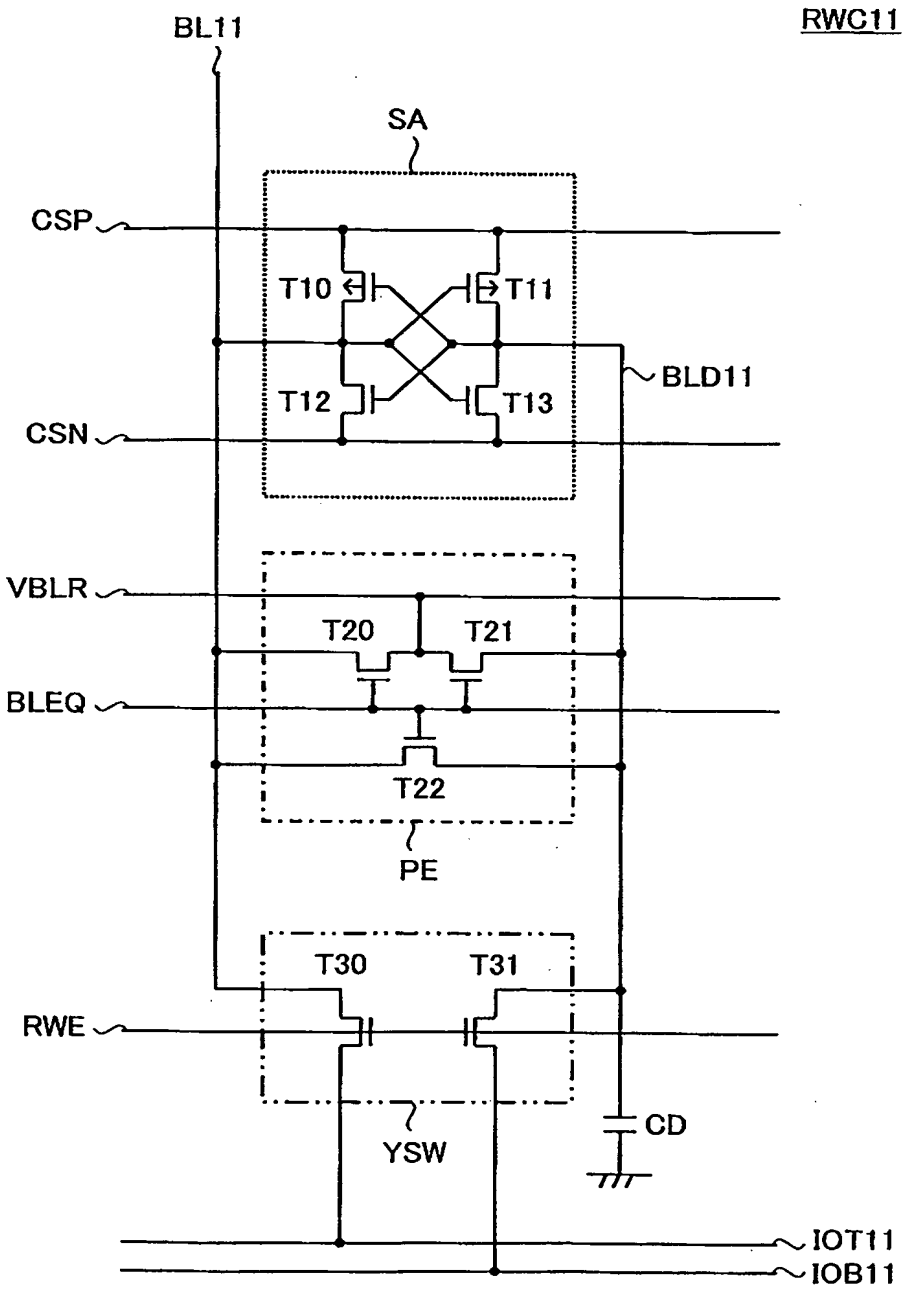
RWC11
BL11
SA
CSP
T10
T11
BLD11
T12
T13
CSN
VBLR
T20
T21
BLEQ
T22
PE
T30
T31
RWE
CD
YSW
IOT11
IOB11

FIG. 20

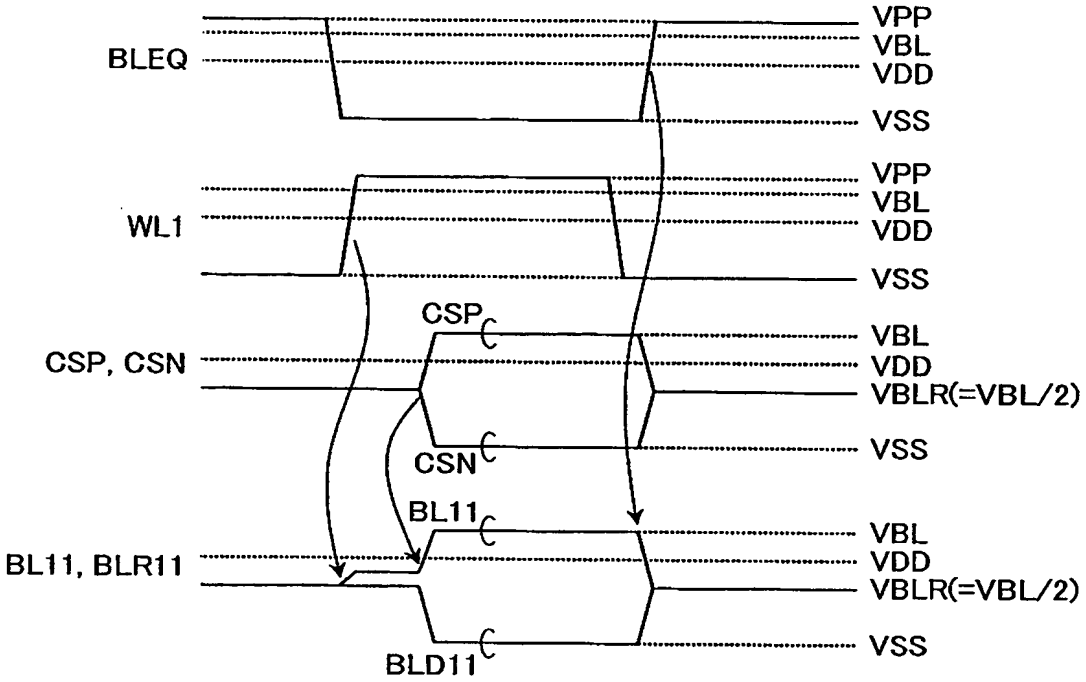
BLEQ
WL1
CSP, CSN
BL11, BLR11
CSP
CSN
BL11
BLD11
VPP
VBL
VDD
VSS
VPP
VBL
VDD
VSS
VBL
VDD
VBLR(=VBL/2)
VSS
VBL
VDD
VBLR(=VBL/2)
VSS

FIG. 21

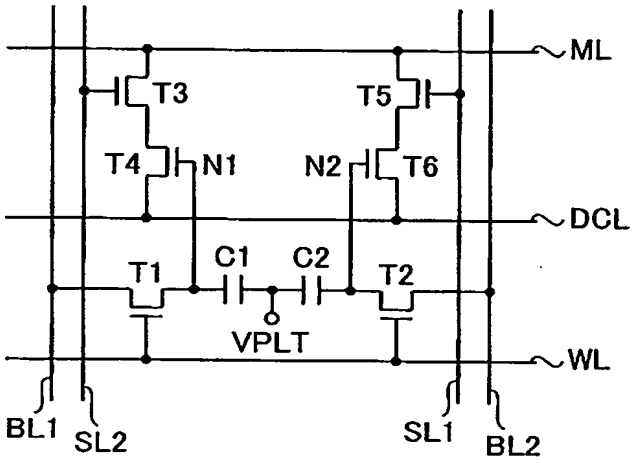
ML
T3
T5
T4
N1
N2
T6
DCL
T1
C1
C2
T2
VPLT
WL
BL1
SL2
SL1
BL2

FIG. 22

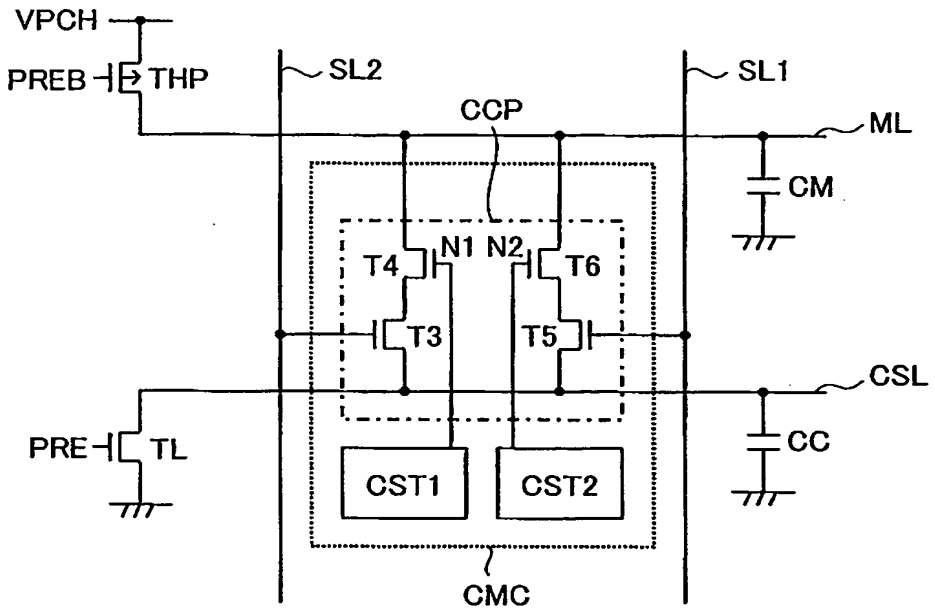
VPCH
PREB
THP
SL2
SL1
CCP
ML
CM
N1
N2
T4
T6
T3
T5
CSL
PRE
TL
CC
CST1
CST2
CMC

FIG. 23

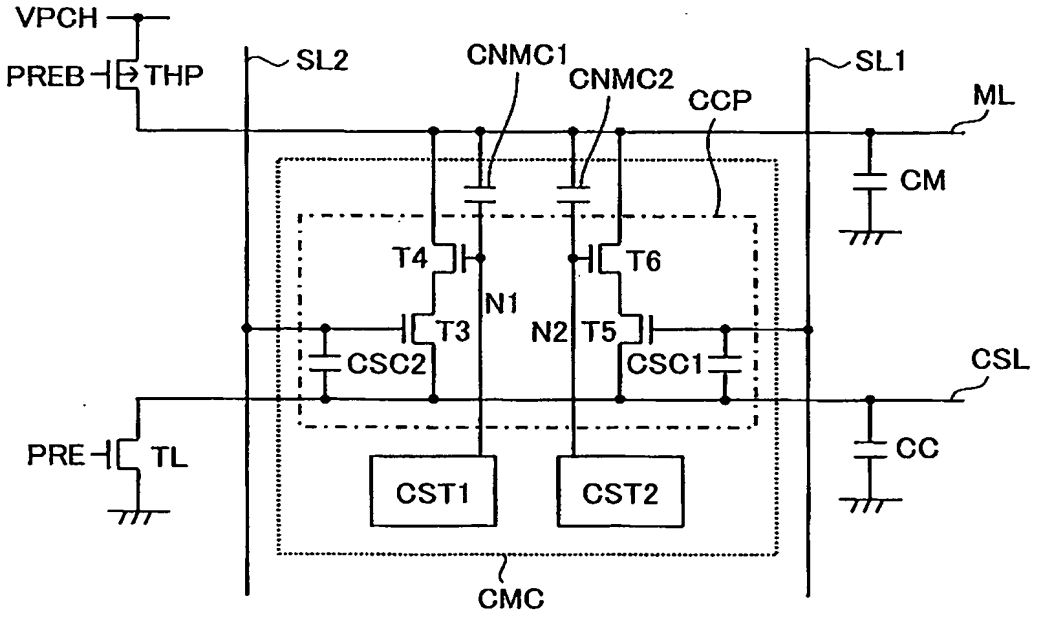
VPCH
PREB
THP
SL2
CNMC1
CNMC2
CCP
SL1
ML
CM
T4
T6
N1
T3
N2
T5
CSC2
CSC1
CSL
PRE
TL
CC
CST1
CST2
CMC

FIG. 24

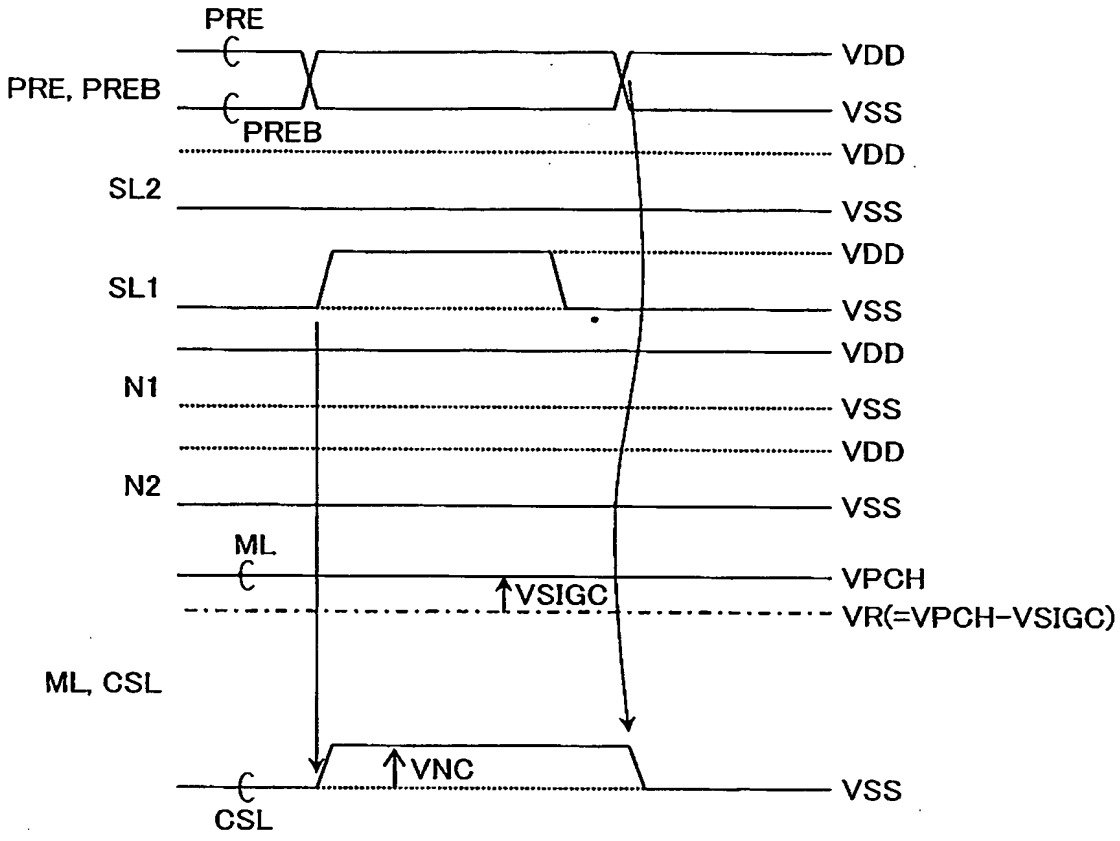
PRE
PRE, PREB
PREB
SL2
SL1
N1
N2
ML
ML, CSL
CSL
VDD
VSS
VDD
VSS
VDD
VSS
VDD
VSS
VDD
VSS
VPCH
VSIGC
VR(=VPCH-VSIGC)
VNC
VSS

FIG. 25

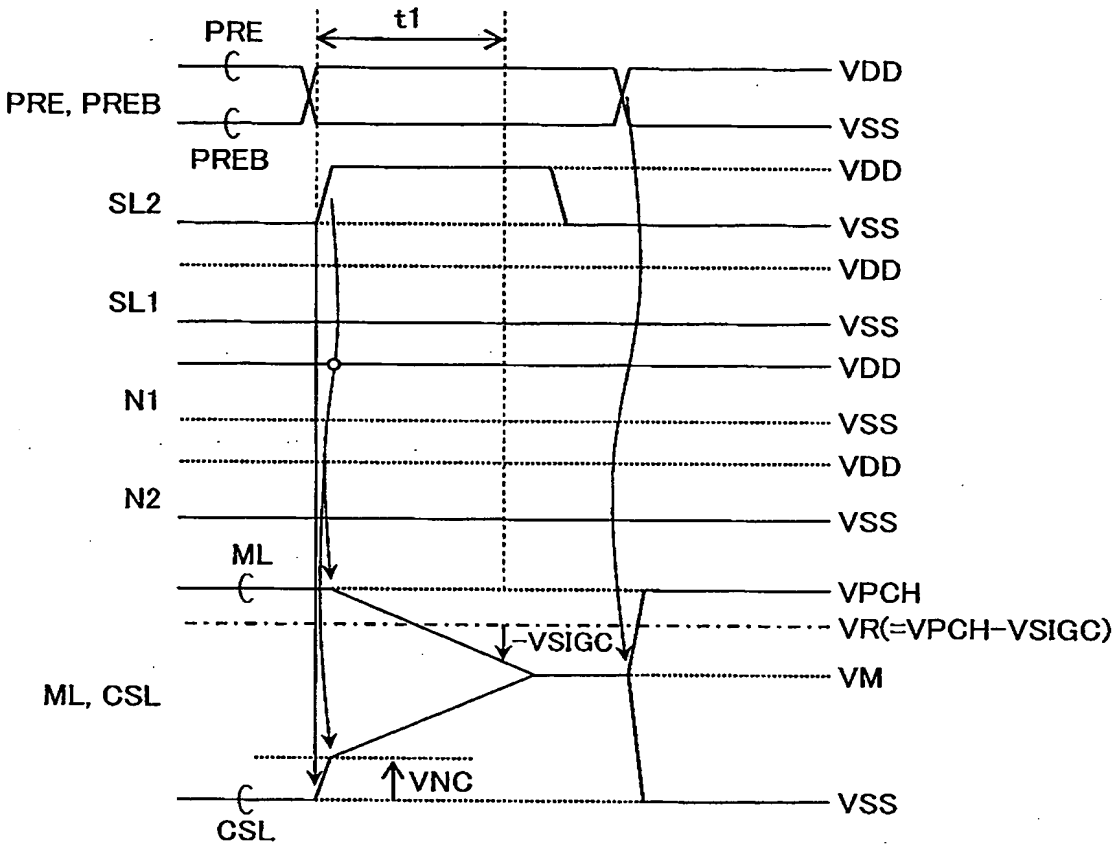
t1
PRE
PRE, PREB
PREB
SL2
SL1
N1
N2
ML
ML, CSL
CSL
VDD
VSS
VDD
VSS
VDD
VSS
VDD
VSS
VDD
VSS
VPCH
VR(=VPCH-VSIGC)
-VSIGC
VM
VNC
VSS

FIG. 26

Search Key			Entry			State of Current Path		Comparison Result
Data	SL2	SL1	Data	N1	N2	M1 Side	M2 Side	
'0'	1	0	'1'	1	0	Conductive	Cut Off	Unmatched
'1'	0	1	'1'	1	0	Cut Off	Cut Off	Matched
'0'	1	0	'0'	0	1	Cut Off	Cut Off	Matched
'1'	0	1	'0'	0	1	Cut Off	Conductive	Unmatched
'0'	1	0	'X'	0	0	Cut Off	Cut Off	Matched
'1'	0	1	'X'	0	0	Cut Off	Cut Off	Matched
'X'	0	0	'1'	1	0	Cut Off	Cut Off	Matched
'X'	0	0	'0'	0	1	Cut Off	Cut Off	Matched
'X'	0	0	'X'	0	0	Cut Off	Cut Off	Matched